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## PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL PATENT APPLICATION under 37 CFR §1.53(b)(2).

PTO/SB/16 (6-95)

Approved for use through 04/11/98. OMB 0651-0037  
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|  |                         |                       |  |  |                        |
|--|-------------------------|-----------------------|--|--|------------------------|
| Docket Number  |                         | CM2341FP              |  | Type a plus sign (+) inside this box ⇒ | +                      |
| INVENTOR(s) / APPLICANT(s)   |                         |                       |  |  |                        |
| LAST NAME  | FIRST NAME              | MIDDLE INITIAL        | RESIDENCE (CITY AND EITHER STATE OR FOREIGN COUNTRY) |  |                        |
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| TITLE OF THE INVENTION (280 characters max)  |                         |                       |  |  |                        |
| Cosmetic Compositions  |                         |                       |  |  |                        |
| CORRESPONDENCE ADDRESS   |                         |                       |  |  |                        |
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| STATE  | Ohio                    | ZIP CODE              | 45217  | COUNTRY                                | USA                    |
| ENCLOSED APPLICATION PARTS (check all that apply)  |                         |                       |  |  |                        |
| <input checked="" type="checkbox"/> Specification  | Number of Pages: 39     | + 1 Abstract          | TOTAL Sheets = 40                                    |  | Small Entity Statement |
| <input type="checkbox"/> Drawing(s)  | Number of Sheets: _____ | Other (specify) _____ |  |  |                        |
| METHOD OF PAYMENT (check one)  |                         |                       |  |  |                        |
| A check or money order is enclosed to cover the Provisional filing fees  |                         |                       |  | PROVISIONAL FILING FEE AMOUNT(S)       | \$150.00               |
| <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge filing fees specified under 37 CFR §1.19(f) and credit Deposit Account Number: 16-2480 |                         |                       |  |  |                        |

The invention was made by an agency of the United States Government or under a contract with an agency of United States Government.

☒ No

☐ Yes, the name of the U. S. Government agency and the Government contract number are: \_\_\_\_\_

Respectfully submitted,

SIGNATURE

Date 4 May 00

TYPED or PRINTED NAME T. David Reed REGISTRATION NO. 32,931  
(if appropriate)

Additional inventors are being named on separately numbered sheets attached hereto

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## **Background to the Invention**

25 Skin is made up of several layers of cells which coat and protect the keratin and collagen fibrous proteins that form the skeleton of its structure. The outermost of these layers, referred to as the stratum corneum, is known to be composed of 25nm protein bundles surrounded by 8nm thick layers. Anionic surfactants and organic solvents typically penetrate the stratum corneum membrane and, by delipidization (i.e. removal of the lipids from the stratum corneum), destroy its  
30 integrity. ~~This destruction of the skin surface topography leads to a rough feel~~ and may eventually permit the surfactant or solvent to interact with the keratin, creating irritation. Many people expose their skin to this type of insult every day. In addition, the skin can be damaged by other factors such as exposure to the sun, exposure to cold air, mechanical abrasion, immersion in water etc. Thus,  
35 there exists a need for a way of mitigating or ameliorating this damage.

In the past compositions have been formulated that are claimed to help to maintain the stratum comeum at its optimum performance in spite of deleterious interactions which the skin may encounter in washing, work, and recreation. Desirable properties for such compositions are that they have good skin feel, water retention, moisturisation, absorption, and/or rub-in characteristics. Prior art compositions have attempted to deliver these properties by the use of one or more 'skin benefit agents'. For example, panthenol, the alcohol form of pantothenic acid, is known for use in skin care products, e.g. shampoos and skin lotions. It has been reported that panthenol, for example in combination with zinc oxide, provides an acceleration of superficial wound healing (see, H. Weise et al., "Acceleration of Superficial Wound Healing by Panthenol Zinc Oxide", Cosmetics and Toiletries, vol. 103, pp. 79-84, October 1988).

There appears to be a direct relationship between the amount of the skin benefit agent and the effectiveness of the composition at delivering benefits to the skin. However, it is also the case that the higher the level of skin benefit agent the higher the risk of the associated negatives. Therefore, to date, it has been necessary to balance the benefits of compositions comprising high levels of the skin benefit agents against the negatives associated with such high levels. Thus, there remains a need for compositions which contain high levels of skin benefit agents, and therefore provide high levels of the associated benefits such as skin feel, skin softness and skin smoothness, but show low levels of the associated negatives such as irritation, stickiness or tackiness.

Quaternary ammonium agents are also known for use in cosmetic compositions. See, for example, WO-A-99/27904, WO-A-96/32089, and EP-A-789,076. Also, US-A-5,804,205 which discloses skin care compositions which are claimed to provide a high degree of moisturisation without leaving a "tacky" or "sticky" residue. The compositions contain quaternary ammonium compounds having two alkyl groups of 16-22 carbon atoms, humectant and non-irritating hydrophobic microspheres having an average particle size of less than 50  $\mu\text{m}$ . It is claimed that the hydrophobic polymeric microspheres significantly reduce the "tackiness" associated with high humectant levels. The compositions of US-A-5,804,205 may also contain low levels of emollients such as petrolatum or mineral oil.

It has now been unexpectedly found that compositions comprising at least one quaternary ammonium agent and greater than 0.5% of pantothenic acid or pantothenic acid derivative and mixtures thereof provide good skin benefits and protect the skin. These compositions have improved user acceptance and, thus, promote better user compliance with concomitant overall improved skin care benefits.

While not wishing to be bound by theory, it is believed that the quaternary ammonium agents of the present invention drive the deposition of the pantothenic acid or pantothenic acid derivative onto the skin. This ensures that the maximum skin benefit is derived from the actives while minimising the negatives such as irritation, tackiness and/or stickiness. Also, the quaternary ammonium agents help reduce the loss of the actives from the skin due to environmental factors such as water or abrasion. Moreover, it is believed that the quaternary ammonium agents themselves deliver skin care benefits, such as good moisturisation, good skin feel, good skin softness.

#### Summary of the Invention

According to the present invention there is provided a cosmetic composition comprising:

- (a) at least one quaternary ammonium agent; and
- (b) greater than 0.5% of pantothenic acid or pantothenic acid derivative and mixtures thereof.

The compositions of the present invention give the benefits associated with pantothenic acid or pantothenic acid derivatives such as wound healing and skin-protection while reducing the associated negatives such as irritation, tackiness and/or stickiness.

#### Detailed Description of the Invention

The compositions of the present invention comprise at least one quaternary ammonium agent and greater than 0.5% of pantothenic acid or pantothenic acid derivative and mixtures thereof. These elements will be described in more detail below.

The present compositions can be used for any suitable purpose. In particular, the present compositions are suitable for topical application to the skin. In particular, the skin care compositions can be in the form of creams, lotions, gels, and the like. Preferably the cosmetic compositions herein are in the form of an oil-in-water emulsion of one or more oil phases in an aqueous continuous phase, each oil phase comprising a single oily component or a mixture of oily components in miscible or homogeneous form but said different oil phases containing different materials or combinations of materials from each other.

The compositions of the present invention preferably comprise vesicles. Preferably said vesicles comprise quaternary ammonium agent and pantothenic acid or pantothenic acid derivative. As used herein the term "vesicle" means one or more bilayers arranged in a closed, usually spherical geometry, said bilayer comprises quaternary ammonium agent as described hereinbelow.

Preferably the compositions of the present invention comprise less than 10%, preferably less than 5%, more preferably less than 3%, even more preferably 0%, by weight, of anionic surfactant.

The compositions of the present invention are preferably formulated so as to have a product viscosity of at least about 1,000 mPa.s and preferably in the range from about 1,000 to about 300,000 mPa.s, more preferably from about 2,500 to about 250,000 mPa.s and especially from about 5,000 to about 200,000 mPa.s (26.8°C, neat, Brookfield DV-II+ Spindle CP52/CP41).

#### **Quaternary Ammonium Agent**

The compositions of the present invention must comprise at least one quaternary ammonium agent. Any quaternary ammonium agent suitable for use in cosmetic compositions may be used herein. As used herein the term "quaternary ammonium agent" means a compound or mixture of compounds having a quaternary nitrogen atom substituted with one or more, preferably two, moieties containing six or more carbon atoms. Preferably the quaternary ammonium agents for use herein are selected from those having a quaternary nitrogen substituted with two moieties wherein each moiety comprises ten or more, preferably 12 or more, carbon atoms. Highly preferred quaternary ammonium

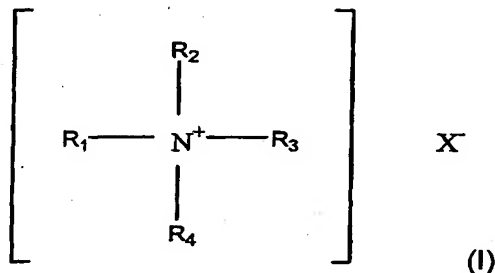
agents for use herein are selected from those which are able to form vesicles in polar solvents, as detected by microscopic analysis (polarised light microscopy at a magnification of x60 using a Nikon Eclipse E800 microscope).

- 5 Preferably the present compositions comprise at least 0.01%, more preferably at least 0.1%, even more preferably at least 1.5%, still more preferably at least 3%, by weight, of quaternary ammonium agent.

Preferably the quaternary ammonium agents for use herein are selected from:

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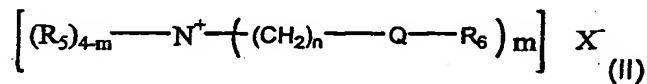
(a) quaternary ammonium compounds according to general formula (I):

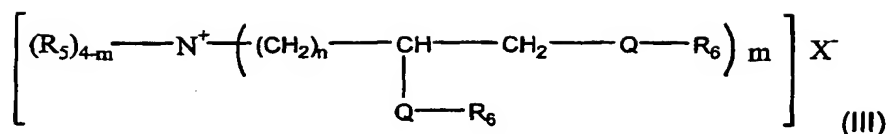


- 15 wherein,  $R_1$  &  $R_2$  are each  $C_1$ - $C_4$  alkyl or  $C_1$ - $C_4$  hydroxyalkyl groups or hydrogen.  $R_3$  &  $R_4$  are each alkyl or alkenyl groups having from about 8 to about 22 carbon atoms.  $X^-$  is a salt forming anion, compatible with quaternary ammonium compounds and other adjunct ingredients.

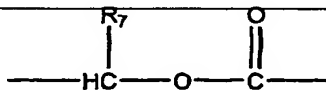
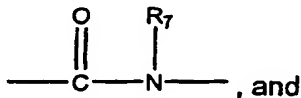
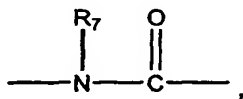
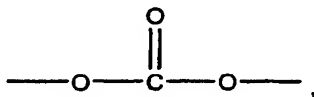
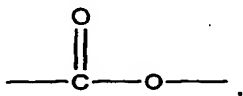
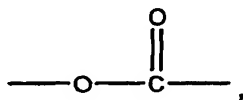
- 20 Preferred quaternary ammonium compounds of this type are quaternised amines having the general formula (I) where  $R_1$  &  $R_2$  are methyl or hydroxyethyl and  $R_3$  &  $R_4$  are linear or branched alkyl or alkenyl chains comprising at least 11 atoms, preferably at least 15 carbon atoms.

- 25 (b) quaternary ammonium compounds according to general formula (II) or (III):





wherein, each  $R_5$  unit is independently selected from hydrogen, branched or straight chain  $C_1$ - $C_6$  alkyl, branched or straight chain  $C_1$ - $C_6$  hydroxyalkyl and mixtures thereof, preferably methyl and hydroxyethyl; each  $R_6$  unit is independently linear or branched  $C_{11}$ - $C_{22}$  alkyl, linear or branched  $C_{11}$ - $C_{22}$  alkenyl, and mixtures thereof;  $X^-$  is an anion which is compatible with skin care actives and adjunct ingredients;  $m$  is from 1 to 4, preferably 2;  $n$  is from 1 to 4, preferably 2 and  $Q$  is a carbonyl unit selected from:



wherein  $R_7$  is hydrogen,  $C_1$ - $C_4$  alkyl,  $C_1$ - $C_4$  hydroxyalkyl, and mixtures thereof.

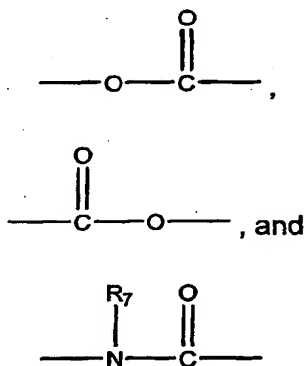
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In the above quaternary ammonium compound example, the unit  $-QR_6$  contains a fatty acyl unit which is typically derived from a triglyceride source. The triglyceride source is preferably derived from tallow, partially hydrogenated tallow, lard, partially hydrogenated lard, vegetable oils and/or partially hydrogenated vegetable oils, such as, canola oil, safflower oil, peanut oil, rapeseed oil, sunflower oil, corn oil, soybean oil, tall oil, rice bran oil, etc. and mixtures of these oils.

The counterion,  $X^-$  in the above compounds, can be any compatible anion, preferably the anion of a strong acid, for example, chloride, bromide, methylsulfate, ethylsulfate, sulfate, nitrate and the like, more preferably chloride or methyl sulfate. The anion can also, but less preferably, carry a double charge in which case  $X^-$  represents half a group.

The preferred quaternary ammonium compounds of the present invention are the diester and/or diamide Quaternary Ammonium (DEQA) compounds, the diesters and diamides having general formula (II), wherein the carbonyl group Q is selected from:

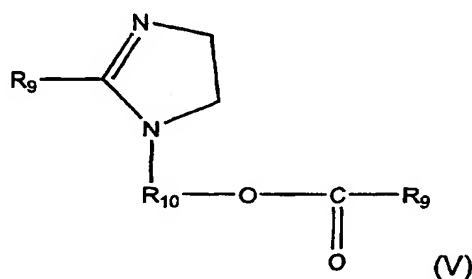
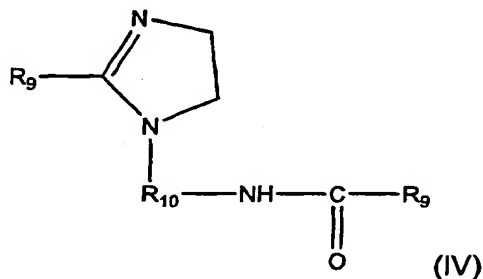


Tallow, canola and palm oil are convenient and inexpensive sources of fatty acyl units which are suitable for use in the present invention as  $R_6$  units.

The counterion,  $X^-$ , can be chloride, bromide, methylsulfate, formate, sulfate, nitrate, and mixtures thereof. In fact, the anion,  $X^-$ , is merely present as a counterion of the positively charged quaternary ammonium compounds. The scope of this invention is not considered limited to any particular anion.

As used herein, when the diester is specified, it will include the monoester and triester that are normally present as a result of the manufacture process.

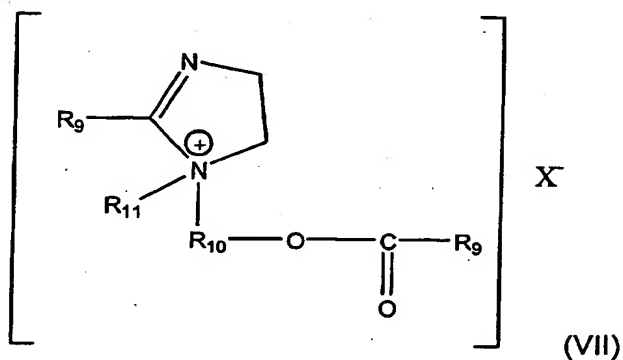
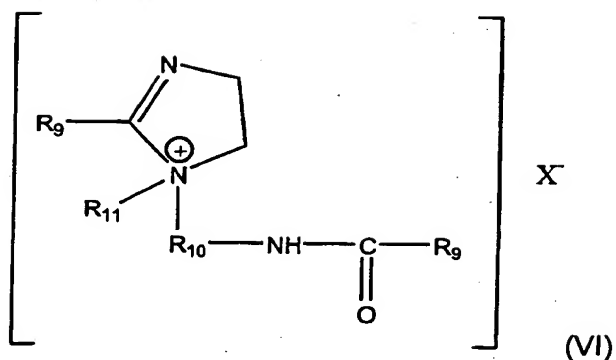
- 5 (c) quaternary ammonium compounds according to general formula (IV) or (V):



wherein  $R_9$  is an acyclic aliphatic  $C_{15}-C_{21}$  hydrocarbon group and  $R_{10}$  is a  $C_1-C_6$  alkyl or alkylene group.

- 15 These ammonium compounds, having a  $pK_a$  value of not greater than about 4, are able to generate a cationic charge in situ when dispersed in an aqueous solution, providing that the pH of the final composition is not greater than about 6.

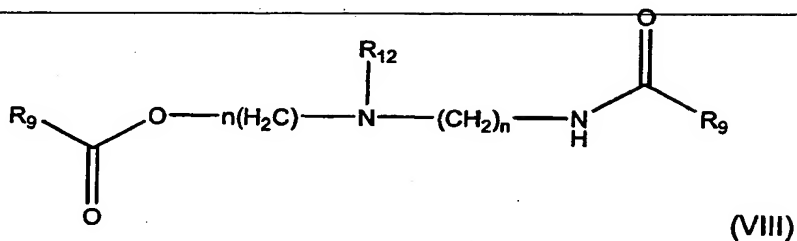
(d) quaternary ammonium compounds according to general formula (VI) or (VII):

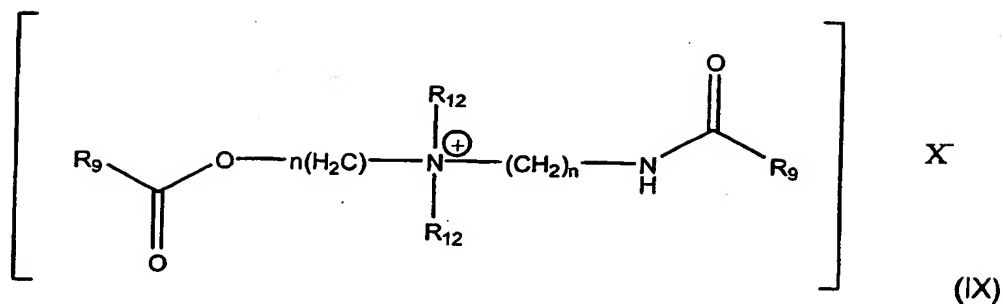


- 5 wherein  $\text{R}_9$  &  $\text{R}_{10}$  are as specified hereinabove and  $\text{R}_{11}$  is selected from  $\text{C}_1$ - $\text{C}_4$  alkyl and hydroxyalkyl groups.

- The counterion,  $\text{X}^-$ , can be chloride, bromide, methylsulfate, formate, sulfate, nitrate, and mixtures thereof. In fact, the anion,  $\text{X}$ , is merely present as a  
 10 counterion of the positively charged quaternary ammonium compounds. The scope of this invention is not considered limited to any particular anion.

(e) quaternary ammonium compounds according to general formula (VIII) or (IX):



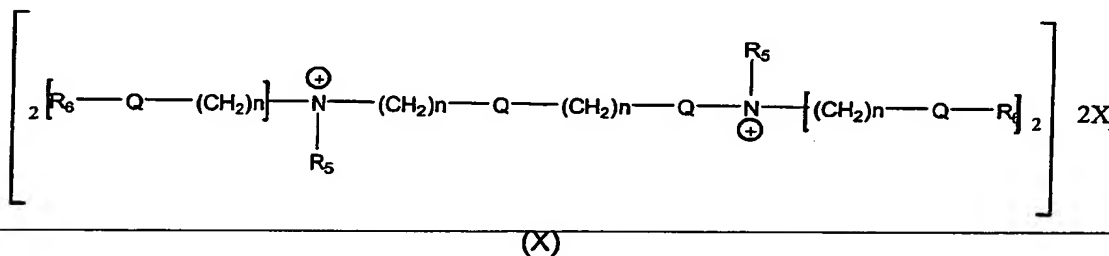


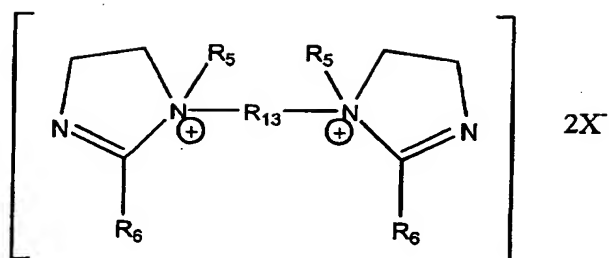
wherein,  $n$  is from 1 to 6,  $\text{R}_9$  is selected from acyclic aliphatic  $\text{C}_{15}$ - $\text{C}_{21}$  hydrocarbon groups and  $\text{R}_{12}$  is selected from  $\text{C}_1$ - $\text{C}_4$  alkyl and hydroxyalkyl groups.

These ammonium compounds (VIII), having a  $\text{pK}_a$  value of not greater than about 4, are able to generate a cationic charge in situ when dispersed in an aqueous solution, providing that the pH of the final composition is not greater than about 6.

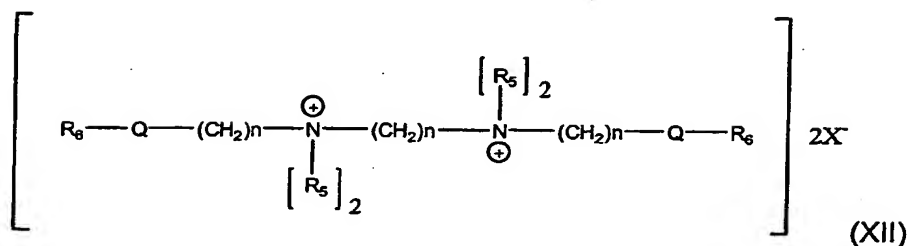
The counterion,  $\text{X}^-$  (IX), can be chloride, bromide, methylsulfate, formate, sulfate, nitrate, and mixtures thereof. In fact, the anion,  $\text{X}$ , is merely present as a counterion of the positively charged quaternary ammonium compounds. The scope of this invention is not considered limited to any particular anion.

(f) diquaternary ammonium compounds according to general formula (X), (XI), (XII) or (XIII):

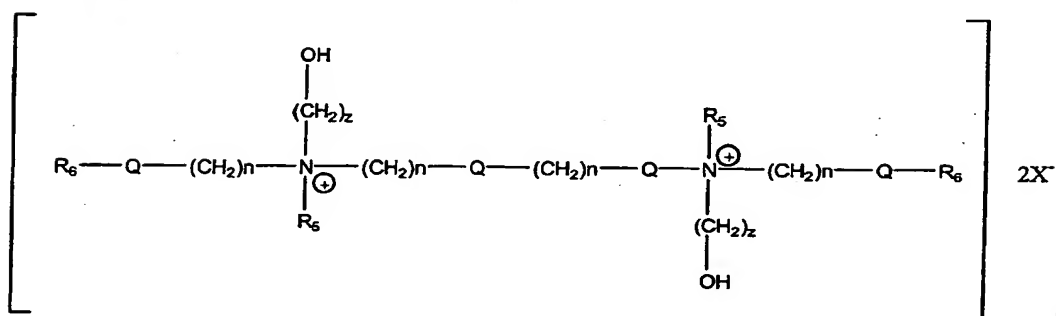




(XI)



(XII)



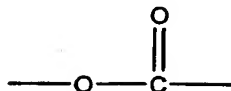
XIII)

wherein R<sub>5</sub>, R<sub>6</sub>, Q, n & X<sup>-</sup> are as defined hereinabove in relation to general formula (II) and (III), R<sub>13</sub> is selected from C<sub>1</sub>-C<sub>6</sub> alkylene groups, preferably an ethylene group and z is from 0 to 4.

~~(g) mixtures of the above quaternary ammonium compounds.~~

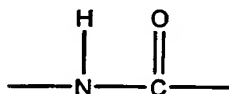
15 The preferred quaternary ammonium agents for use in the present invention are those described in section (b) hereinabove. In particular, diester and/or diamide quaternary ammonium (DEQA) compounds according to general formula (II) hereinabove are preferred. Preferred diesters for use herein are those according

to general formula (II) wherein  $R_5$ ,  $R_6$ , and  $X^-$  are as defined hereinabove and Q is:



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Preferred diamides for use herein are those according to general formula (II) wherein  $R_5$ ,  $R_6$ , and  $X^-$  are as defined hereinabove and Q is:



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Preferred examples of quaternary ammonium compounds suitable for use in the compositions of the present invention are N,N-di(canolyloxy-ethyl)-N,N-dimethyl ammonium chloride, N,N-di(canolyloxy-ethyl)-N-methyl,N-(2-hydroxyethyl) ammonium methyl sulfate, N,N-di(canolyloxy-ethyl)-N-methyl, N-(2-hydroxyethyl) ammonium chloride and mixtures thereof. Particularly preferred for use herein is N,N-di(canolyloxy-ethyl)-N-methyl,N-(2-hydroxyethyl) ammonium methyl sulfate.

Although quaternary ammonium compounds are derived from "canoly" fatty acyl groups are preferred, other suitable examples of quaternary ammonium compounds are derived from fatty acyl groups wherein the term "canoly" in the above examples is replaced by the terms "tallowyl, cocoyl, palmyl, lauryl, oleyl, ricinoleyl, stearyl, palmityl" which correspond to the triglyceride source from which the fatty acyl units are derived. These alternative fatty acyl sources can comprise either fully saturated, or preferably at least partly unsaturated chains.

25

#### **Pantothenic Acid Derivatives**

The compositions of the present invention also comprise greater than 0.5% by weight of pantothenic acid and/or a pantothenic acid precursor or derivative and mixtures thereof. Pantothenic acid, which is also known as N-(2,4-dihydroxy-3,3-dimethylbutyryl)-B-alanine, is a member of the B complex vitamins and is sometimes known as vitamin B<sub>5</sub>. Pantothenic acid is a dietary essential for most mammals. The material can exist as the D(+) form, the L(-) form, and the racemate. See The Merck Index, Tenth Edition, entry 6877, p. 1007 (1983).

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A variety of pantothenic acid precursors or derivatives are known and or can be synthesized. Nonlimiting examples include the alcohol, aldehyde, alcohol esters, acid esters, and the like. Suitable examples are detailed in U.S. Patents 3,230,228; 4,514,338; 4,602,036; 5,136,093; and 5,750,122. Especially preferred for use in the compositions of the instant invention is the alcohol derivative of pantothenic acid. This alcohol, which is also known as panthenol, pantothenol, pantothenyl alcohol, and 2,4-dihydroxy-N-(3-hydroxypropyl)-3,3-dimethylbutanamide is a stable source of pantothenic acid activity. Like the parent acid, panthenol can exist as the D(+) form, the L(-) form, and the racemate. See The Merck Index, Tenth Edition, entry 2910, p. 426 (1983).

The pantothenic acid precursors or derivatives are effective in reducing the irritation caused by vitamin B<sub>3</sub> compounds as a result of individual factors (e.g., hypersensitivity) and/or environmental conditions. With respect to environmental conditions, the irritation reducing compositions of the present invention are preferably administered under environmental temperatures of from 20°C to 55°C, preferably from 25°C to 50°C, most preferably from 30°C to 45°C and/or relative humidities of from 50% to 100%, preferably from 65% to 100%, most preferably from 80% to 100%.

The pantothenic acid and or pantothenic acid precursor or derivative of the compositions useful in the instant invention is preferably present in an amount of from 0.6% to 10%, more preferably from 0.75% to 5%, even more preferably from 0.85% to 3.5%.

Preferably the compositions of the present invention comprise from 0.6% to 10%, more preferably from 0.75% to 5%, even more preferably from 0.85% to 3.5%, by weight of panthenol. D-panthenol, also known as dexpanthenol, is particularly preferred for use herein.

#### Optional Ingredients

The compositions herein can contain a variety of optional components suitable for rendering the present compositions more cosmetically or aesthetically acceptable or to provide them with additional usage benefits. Such conventional optional ingredients are well-known to those skilled in the art. These include any cosmetically acceptable ingredients such as those found in the CTFA

*International Cosmetic Ingredient Dictionary and Handbook, 7th edition, edited by Wenninger and McEwen, (The Cosmetic, Toiletry, and Fragrance Association, Inc., Washington, D.C., 1997). Some non-limiting examples of these optional ingredients are given below.*

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### **Skin Benefit Agent**

It is highly preferred that the compositions of the present invention comprise a skin benefit agent. As used herein the term "skin benefit agent" means any compound or mixture of compounds which, for example, gives moisturisation, protection, skin feel, skin softness and/or skin smoothness benefits to the skin. Preferred skin benefit agents for use herein are humectants, emollients and mixtures thereof. Preferably the compositions of the present invention comprise humectants and emollients.

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Preferably the compositions of the present invention comprise at least 1% by weight of skin benefit agent. More preferably the present compositions comprise from 2% to 70%, preferably 5% to 60%, even more preferably 10% to 55%, by weight of skin benefit agent.

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### **Humectant**

A highly preferred optional ingredient for the compositions of the present invention is humectant. As used herein the term "humectant" means a substance which provides the skin with water-retention benefits. Preferably, the compositions of the present invention comprise at least 1%, more preferably at least 5%, even more preferably at least 10%, even more still preferably at least 20%, by weight of humectant.

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Any humectant suitable for use in cosmetic compositions may be used herein. Non-limiting examples of suitable humectants for use in the present invention are described in WO98/22085, WO98/18444 and WO97/01326. Preferably the humectants for use herein are selected from, but not limited to; amino acids and derivatives thereof such as proline and arginine aspartate, 1,3-butylene glycol, propylene glycol and water and codium tomentosum extract, collagen amino acids or peptides, creatinine, diglycerol, biosaccharide gum-1, glucamine salts, glucuronic acid salts, glutamic acid salts, polyethylene glycol ethers of glycerine (e.g. glycereth 20), glycerine, glycerol monopropoxylat, glycogen, hexylene

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glycol, honey, and extracts or derivatives thereof, hydrogenated starch hydrolysates, hydrolyzed mucopolysaccharides, inositol, keratin amino acids, urea, LAREX A-200 (available from Larex), glycosaminoglycans, methoxy PEG 10, methyl gluceth-10 and -20 (both commercially available from Amerchol located in Edison, NJ), methyl glucose, 3-methyl-1,3-butanediol, N-acetyl glucosamine salts, polyethylene glycol and derivatives thereof (such as PEG 15 butanediol, PEG 4, PEG 5 pentaerythritol, PEG 6, PEG 8, PEG 9), pentaerythritol, 1,2 pentanediol, PPG-1 glyceryl ether, PPG-9, 2-pyrrolidone-5-carboxylic acid and its salts such as glyceryl pca, saccharide isomerate, SEACARE (available from Secma), sericin, silk amino acids, sodium acetylhyaluronate, sodium hyaluronate, sodium poly-aspartate, sodium polyglutamate, sorbeth 20, sorbeth 6, sugar and sugar alcohols and derivatives thereof such as glucose, mannose and polyglycerol sorbitol, trehalose, triglycerol, trimethylolpropane, tris (hydroxymethyl) amino methane salts, and yeast extract, and mixtures thereof.

More preferably, the humectants for use herein are selected from glycerine, urea, butylene glycol, polyethylene glycol and derivatives thereof, or mixtures thereof. Even more preferably, the humectants for use herein are selected from glycerine, urea and mixtures thereof, especially glycerine.

### **Emollients**

Another highly preferred optional ingredient of the compositions of the present invention is emollient. Emollients tend to lubricate the skin, increase the smoothness and suppleness of the skin, prevent or relieve dryness of the skin, and/or protect the skin. A wide variety of suitable emollients are known and may be used herein. *Sagarin, Cosmetics, Science and Technology, 2nd Edition, Vol. 1, pp. 32-43 (1972)* contains numerous examples of materials suitable for use as emollients. Preferably the compositions of the present invention comprise greater than 1%, more preferably at least 5%, even more preferably at least 10%, by weight, of emollient.

Preferably the emollients for use herein are selected from:

- i) Straight and branched chain hydrocarbons having from about 7 to about 40 carbon atoms, such as dodecane, squalane, petrolatum, cholesterol and derivatives thereof, hydrogenated polyisobutylene, isohexadecane and the  $C_7$ - $C_{40}$  isoparaffins, which are  $C_7$ - $C_{40}$  branched hydrocarbons.

ii)  $C_1$ - $C_{30}$  alcohol esters of  $C_1$ - $C_{30}$  carboxylic acids and of  $C_2$ - $C_{30}$  dicarboxylic acids, e.g. isononyl isononanoate, isopropyl myristate, myristyl propionate, isopropyl stearate, behenyl behenate, dioctyl maleate, diisopropyl adipate, and diisopropyl dilinoleate.

5 iii) mono-, di- and tri- glycerides of  $C_1$ - $C_{30}$  carboxylic acids and ethoxylated derivatives thereof. Suitable polyethylene glycol derivatives of glycerides include PEG-20 almond glycerides, PEG-60 almond glycerides, PEG-11 avocado glycerides, PEG-6 capric/caprylic glycerides, PEG-8 capric/caprylic glycerides, PEG-20 corn glycerides, PEG-60 corn glycerides, PEG-60 evening primrose glycerides, PEG-7 glyceryl cocoate, PEG-30 glyceryl cocoate, PEG-40 glyceryl cocoate, PEG-78 glyceryl cocoate, PEG-80 glyceryl cocoate, PEG-12 glyceryl dioleate, PEG-15 glyceryl isostearate, PEG-20 glyceryl isostearate, PEG-30 glyceryl isostearate, PEG-75 cocoa butter glycerides, PEG-20 hydrogenated palm oil glycerides, PEG-70 mango glycerides, PEG-13 mink glycerides, PEG-75 shorea butter glycerides, PEG-10 olive glycerides, PEG-12 palm kernel glycerides, PEG-45 palm kernel glycerides, PEG-8 glyceryl laurate and PEG-30 glyceryl laurate. Mixtures of polyethylene glycol derivatives of glycerides can also be used herein.

iv) alkylene glycol esters of  $C_1$ - $C_{30}$  carboxylic acids, e.g. ethylene glycol mono- and di- esters, and propylene glycol mono- and di- esters of  $C_1$ - $C_{30}$  carboxylic acids e.g., ethylene glycol distearate.

v) Organopolysiloxane oils. The organopolysiloxane oil may be volatile, non-volatile, or a mixture of volatile and non-volatile silicones. The term "non-volatile" as used in this context refers to those silicones that are liquid under ambient conditions and have a flash point (under one atmospheric of pressure) of or greater than about 100°C. The term "volatile" as used in this context refers to all other silicone oils. Suitable organopolysiloxanes can be selected from a wide variety of silicones spanning a broad range of volatilities and viscosities. Non-volatile polysiloxanes are preferred. Suitable

silicones are disclosed in U.S. Patent No. 5,069,897, issued December 3, 1991. Preferred for use herein are organopolysiloxanes selected from polyalkylsiloxanes, alkyl substituted dimethicones, dimethiconols, polyalkylaryl siloxanes, and mixtures thereof. More preferred for use herein are polyalkylsiloxanes and cyclomethicones. Preferred among the polyalkylsiloxanes are dimethicones.

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- vi) Vegetable oils and hydrogenated vegetable oils. Examples of vegetable oils and hydrogenated vegetable oils include safflower oil, castor oil, coconut oil, cottonseed oil, menhaden oil, palm kernel oil, palm oil, peanut oil, soybean oil, rapeseed oil, linseed oil, rice bran oil, pine oil, sesame oil, sunflower seed oil, partially and fully hydrogenated oils from the foregoing sources, and mixtures thereof.
- vii) animal fats and oils, e.g. cod liver oil, lanolin and derivatives thereof such as acetylated lanolin and isopropyl lanolate. Lanolin oil is preferred.
- viii) Also useful are  $C_4$ - $C_{20}$  alkyl ethers of polypropylene glycols,  $C_1$ - $C_{20}$  carboxylic acid esters of polypropylene glycols, and di-  $C_8$ - $C_{30}$  alkyl ethers, examples of which include PPG-14 butyl ether, PPG-15 stearyl ether, dioctyl ether, dodecyl octyl ether, and mixtures thereof.
- ix) polyol carboxylic acid esters.
- x) mixtures of the above.

Preferred emollients for use in the compositions herein are selected from dodecane, squalane, cholesterol and derivatives thereof, isohexadecane, isononyl isononanoate, petrolatum, lanolin and derivatives thereof, safflower oil, castor oil, coconut oil, cottonseed oil, palm kernel oil, palm oil, peanut oil, soybean oil, polyol carboxylic acid esters and mixtures thereof. More preferred emollients for use herein are selected from polyol carboxylic acid esters, petrolatum and mixtures thereof.

These esters are derived from a sugar or polyol moiety and one or more carboxylic acid moieties. Depending on the constituent acid and sugar, these esters can be in either liquid or solid form at room temperature. Examples of liquid esters include: glucose tetraoleate, the glucose tetraesters of soybean oil fatty acids (unsaturated), the mannose tetraesters of mixed soybean oil fatty acids, the galactose tetraesters of oleic acid, the arabinose tetraesters of linoleic acid, xylose tetralinoleate, galactose pentaoleate, sorbitol tetraoleate, the sorbitol hexaesters of unsaturated soybean oil fatty acids, xylitol pentaoleate, sucrose tetraoleate, sucrose pentaoleate, sucrose hexaoleate, sucrose hepatoleate, sucrose octaoleate, and mixtures thereof. Examples of solid esters include: sorbitol hexaester in which the carboxylic acid ester moieties are palmitoleate and arachidate in a 1:2 molar ratio; the octaester of raffinose in which the carboxylic acid ester moieties are linoleate and behenate in a 1:3 molar ratio; the

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heptaester of maltose wherein the esterifying carboxylic acid moieties are sunflower seed oil fatty acids and lignocerate in a 3:4 molar ratio; the octaester of sucrose wherein the esterifying carboxylic acid moieties are oleate and behenate in a 2:6 molar ratio; and the octaester of sucrose wherein the esterifying

5 carboxylic acid moieties are laurate, linoleate and behenate in a 1:3:4 molar ratio.

A preferred solid material is sucrose polyester in which the degree of esterification is 7-8, and in which the fatty acid moieties are C18 mono- and/or di-unsaturated and behenic, in a molar ratio of unsaturates: behenic of 1:7 to 3:5. A particularly preferred solid sugar polyester is the octaester of sucrose in which

10 there are about 7 behenic fatty acid moieties and about 1 oleic acid moiety in the molecule. Other materials include cottonseed oil or soybean oil fatty acid esters of sucrose. The ester materials are further described in, U. S. Patent No. 2,831,854, U. S. Patent No. 4,005,196, to Jandacek, issued January 25, 1977; U. S. Patent No. 4,005,195, to Jandacek, issued January 25, 1977, U. S. Patent No. 5,306,516, to Letton et al., issued April 26, 1994; U. S. Patent No. 5,306,515, to Letton et al., issued April 26, 1994; U. S. Patent No. 5,305,514, to Letton et al., issued April 26, 1994; U. S. Patent No. 4,797,300, to Jandacek et al., issued January 10, 1989; U. S. Patent No. 3,963,699, to Rizzi et al, issued June 15, 1976; U. S. Patent No. 4,518,772, to Volpenhein, issued May 21, 1985; and U. S. Patent No. 4,517,360, to Volpenhein, issued May 21, 1985.

The polyol fatty acid polyesters suitable for use herein can be prepared by a variety of methods well known to those skilled in the art. These methods include: transesterification of the polyol with methyl, ethyl or glycerol fatty acid esters using a variety of catalysts; acylation of the polyol with a fatty acid chloride; acylation of the polyol with a fatty acid anhydride; and acylation of the polyol with a fatty acid, per se. See, for example, U.S. Patent No. 2,831,854; U.S. Patent No. 4,005,196, to Jandacek, issued January 25, 1977.

30 An especially preferred material is known by the INCI name sucrose polycottonseedate.

#### ***Other Skin Benefit Agents***

Other skin benefit agents may be useful in the compositions of the present invention. Examples of other skin benefit agents that may be used in the present compositions include:

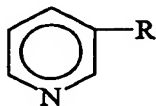
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(a) Vitamin Compounds

Other than those discussed hereinabove, the present compositions may comprise vitamin compounds, precursors, and derivatives thereof. These vitamin compounds may be in either natural or synthetic form. Suitable vitamin compounds include, Vitamin A (e.g., beta carotene, retinoic acid, retinol, retinoids, retinyl palmitate, retinyl propionate, etc.), Vitamin B (e.g., niacin, niacinamide, riboflavin, etc.), Vitamin C (e.g., ascorbic acid, etc.), Vitamin D (e.g., ergosterol, ergocalciferol, cholecalciferol, etc.), Vitamin E (e.g. tocopherol acetate etc.) and Vitamin K (e.g. phytonadione, menadione, phthiocol, etc.) compounds.

Preferred vitamin compounds for use in the compositions of the present invention are vitamin B<sub>3</sub> compounds. Vitamin B<sub>3</sub> compounds are particularly useful for regulating skin condition as described WO-A-97/39733. When present, the compositions of the present invention preferably comprise from about 0.01% to about 50%, more preferably from about 0.1% to about 10%, even more preferably from about 0.5% to about 5%, by weight, of the vitamin B<sub>3</sub> compound.

As used herein, "vitamin B<sub>3</sub> compound" means a compound having the formula:



wherein R is -CONH<sub>2</sub> (i.e., niacinamide), -COOH (i.e., nicotinic acid) or -CH<sub>2</sub>OH (i.e., nicotinyl alcohol); derivatives thereof; and salts of any of the foregoing.

Exemplary derivatives of the foregoing vitamin B<sub>3</sub> compounds include nicotinic acid esters, including non-vasodilating esters of nicotinic acid, nicotinyl amino acids, nicotinyl alcohol esters of carboxylic acids, nicotinic acid N-oxide and niacinamide N-oxide.

Examples of suitable vitamin B<sub>3</sub> compounds are well known in the art and are commercially available from a number of sources, e.g., the Sigma Chemical Company (St. Louis, MO); ICN Biomedicals, Inc. (Irvin, CA) and Aldrich Chemical Company (Milwaukee, WI).

The vitamin compounds may be included as the substantially pure material, or as an extract obtained by suitable physical and/or chemical isolation from natural (e.g., plant) sources.

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Other preferred vitamin compounds useful herein include tocopherol-based anti-oxidant/radical scavengers. Preferred tocopherol-based anti-oxidant/radical scavengers are selected from tocopherol (vitamin E), tocopherol acetate, tocopherol sorbate, other esters of tocopherol, and mixtures thereof. Preferably

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tocopherol acetate. For example, the use of tocopherol esters including tocopherol acetate in topical compositions and applicable to the present invention is described in U.S. Patent No. 5,786,384.

Preferably the compositions of the present invention comprise from 0.1% to 10%, more preferably from 0.1% to 5%, by weight of the composition of tocopherol-based anti-oxidant/radical scavenger.

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(b) Anti-Wrinkle and Anti-Skin Atrophy Actives

Examples of anti-wrinkle and anti-skin atrophy actives that may be used in the compositions of the present invention include, but are not limited to, lactic acid and derivatives thereof, retinoic acid and its derivatives (e.g., cis and trans); retinol; retinyl esters; niacinamide, salicylic acid and derivatives thereof; sulfur-containing D and L amino acids and their derivatives and salts, particularly the N-acetyl derivatives, a preferred example of which is N-acetyl-L-cysteine; thiols, e.g., ethane thiol; hydroxy acids, phytic acid, lipoic acid; lysophosphatidic acid, and skin peel agents (e.g., phenol and the like).

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(c) Antimicrobial and Antifungal Actives

Examples of antimicrobial and antifungal actives that may be used in the compositions of the present invention include, but are not limited to,  $\beta$ -lactam drugs, quinolone drugs, ciprofloxacin, norfloxacin, tetracycline, erythromycin, amikacin, 2,4,4'-trichloro-2'-hydroxy diphenyl ether, 3,4,4'-trichlorocarbanilide, phenoxyethanol, phenoxy propanol, phenoxyisopropanol, doxycycline, capreomycin, chlorhexidine, chlortetracycline, oxytetracycline, clindamycin, ethambutol, hexamidine isethionate, metronidazole, pentamidine, gentamicin, kanamycin, lineomycin, methacycline, methenamine, minocycline, neomycin,

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netilmicin, paromomycin, streptomycin, tobramycin, miconazole, tetracycline hydrochloride, erythromycin, zinc erythromycin, erythromycin estolate, erythromycin stearate, amikacin sulfate, doxycycline hydrochloride, capreomycin sulfate, chlorhexidine gluconate, chlorhexidine hydrochloride, chlortetracycline hydrochloride, oxytetracycline hydrochloride, clindamycin hydrochloride, ethambutol hydrochloride, metronidazole hydrochloride, pentamidine hydrochloride, gentamicin sulfate, kanamycin sulfate, lineomycin hydrochloride, methacycline hydrochloride, methenamine hippurate, methenamine mandelate, minocycline hydrochloride, neomycin sulfate, netilmicin sulfate, paromomycin sulfate, streptomycin sulfate, tobramycin sulfate, miconazole hydrochloride, amanfadine hydrochloride, amanfadine sulfate, octopirox, parachlorometa xlenol, nystatin, tolnaftate, zinc pyrithione and clotrimazole.

*(d) Sunscreen Actives*

The compositions herein may also comprise sunscreen actives. A wide variety of sunscreen agents are useful herein. These sunscreen agents include both organic compounds and their salts as well as inorganic particulate materials. Without being limited by theory, it is believed that sunscreen agents provide protection from ultraviolet radiation by one or more of the following mechanisms including absorption, scattering, and reflection of the ultraviolet radiation. Nonlimiting examples of these sunscreen agents are described in U.S. Patent No. 5,087,445, to Haffey et al., issued February 11, 1992; U.S. Patent No. 5,073,372, to Turner et al., issued December 17, 1991; U.S. Patent No. 5,073,371, to Turner et al. issued December 17, 1991; U.S. Patent No. 5,160,731, to Sabatelli et al., issued November 3, 1992; U.S. Patent No. 5,138,089, to Sabatelli, issued August 11, 1992; U.S. Patent No. 5,041,282, to Sabatelli, issued August 20, 1991; U.S. Patent No. 4,999,186, to Sabatelli et al., issued March 12, 1991; U.S. Patent No. 4,937,370, to Sabatelli, issued June 26, 1990; and Segarin, et al., at Chapter VIII, pages 189 et seq., of Cosmetics Science and Technology. Preferred among the sunscreen agents are those selected from the group consisting of 2-ethylhexyl p-methoxycinnamate, octyl salicylate, octocrylene, oxybenzone, 2-ethylhexyl N,N-dimethylaminobenzoate, p-aminobenzoic acid, 2-phenyl-benzimidazole-5-sulfonic acid, homomenthyl salicylate, DEA p-methoxycinnamate, 4,4'-methoxy-t-butylidibenzoylmethane, 4-isopropylidibenzoylmethane, 3-(4-methylbenzylidene) camphor, 3-benzylidene camphor, 4-N,N-dimethylaminobenzoic acid ester with 2,4-

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dihydroxybenzophenone, 4-N,N-dimethylaminobenzoic acid ester with 2-hydroxy-4-(2-hydroxyethoxy)benzophenone, 4-N,N-dimethylaminobenzoic acid ester with 4-hydroxydibenzoyl-methane, 4-N,N-dimethylaminobenzoic acid ester with 4-(2-hydroxyethoxy)dibenzoylmethane, 4-N,N-di(2-ethylhexyl)-aminobenzoic acid ester with 2,4-dihydroxybenzophenone, 4-N,N-di(2-ethylhexyl)aminobenzoic acid ester with 2-hydroxy-4-(2-hydroxyethoxy)benzophenone, 4-N,N-di(2-ethylhexyl)aminobenzoic acid ester with 4-hydroxydibenzoylmethane, 4-N,N-di(2-ethylhexyl)aminobenzoic acid ester with 4-(2-hydroxyethoxy)dibenzoylmethane, 4-N,N-(2-ethylhexyl)methylaminobenzoic acid ester with 2,4-dihydroxybenzophenone, 4-N,N-(2-ethylhexyl)methylaminobenzoic acid ester with 2-hydroxy-4-(2-hydroxyethoxy)benzophenone, 4-N,N-(2-ethylhexyl)methylaminobenzoic acid ester with 4-hydroxydibenzoylmethane, 4-N,N-(2-ethylhexyl)methylaminobenzoic acid ester with 4-(2-hydroxyethoxy)dibenzoylmethane, titanium dioxide, zinc oxide, iron oxide, and mixtures thereof.

More preferred for use in the compositions described herein are the sunscreen agents selected from the group consisting of 2-ethylhexyl N,N-dimethyl-p-aminobenzoate, 2-ethylhexyl p-methoxycinnamate, octocrylene, octyl salicylate, homomenthyl salicylate, p-aminobenzoic acid, oxybenzone, 2-phenylbenzimidazole-5-sulfonic acid, DEA p-methoxycinnamate, 4,4'-methoxy-t-butylidibenzoylmethane, 4-isopropyl dibenzoylmethane, 3-(4-methylbenzylidene) camphor, 3-benzylidene camphor, 4-N,N-(2-ethylhexyl)methylaminobenzoic acid ester with 4-(2-hydroxyethoxy)dibenzoylmethane, titanium dioxide, zinc oxide, iron oxide, and mixtures thereof.

Exact amounts of sunscreens which can be employed will vary depending upon the sunscreen chosen and the desired Sun Protection Factor (SPF) to be achieved. SPF is a commonly used measure of photoprotection of a sunscreen against erythema. See Federal Register, Vol. 43, No. 166, pp. 38206-38269, August 25, 1978.

#### **Polar Solvent**

The compositions of the present invention may also comprise polar solvent. Any polar solvent suitable for use in cosmetic compositions may be used herein. However, the polar solvent must be sufficiently polar to drive the formation of



vesicles in the present invention. Preferably the polar solvent used in the compositions of the present invention is water.

- 5 Preferably comprise the present compositions will comprise from 10% to 90%, more preferably from 20% to 80%, even more preferably from 30% to 60%, by weight, of polar solvent.

### **Thickeners**

- 10 The compositions of the present invention preferably comprise thickeners. Any thickener suitable for use in cosmetic compositions can be used herein. Preferred thickeners are selected from nonionic water-soluble polymers, fatty alcohols and mixtures thereof. Suitable nonionic polymers include such water soluble polymers as cellulose ethers (e.g. hydroxybutyl methyl cellulose, hydroxypropylcellulose, hydroxypropyl methyl cellulose, ethylhydroxy ethyl cellulose, hydrophobically modified hydroxyethyl cellulose and hydroxyethylcellulose), poly(ethylene oxide), polyvinyl alcohol, polyvinylpyrrolidone, hydroxypropyl guar gum, amulose, hydroxyethyl amylose, starch, and starch derivatives. Suitable fatty alcohols are higher molecular weight, nonvolatile, primary alcohols having the general formula



- 20 wherein R is a C<sub>8-20</sub> alkyl. They can be produced from natural fats or oils by reduction of the fatty acid COOH-grouping to the hydroxyl function. Alternatively, identical or similarly structured fatty alcohols can be produced according to conventional synthetic methods known in the art. Suitable fatty alcohols include, but are not limited to behenylalcohol, C<sub>9</sub>-C<sub>11</sub> alcohols, C<sub>12</sub>-C<sub>13</sub> alcohols, C<sub>12</sub>-C<sub>15</sub> alcohols, C<sub>12</sub>-C<sub>18</sub> alcohols, C<sub>14</sub>-C<sub>15</sub> alcohols, caprylic alcohol, cetearyl alcohol, coconut alcohol, decyl alcohol, isocetyl alcohol, isostearyl alcohol, lauryl alcohol, oleyl alcohol, palm kernel alcohol, stearyl alcohol, cetyl alcohol, tallow alcohol, tridecyl alcohol or myristyl alcohol.

### **Other Optional Ingredients**

- 35 The compositions of the present invention can comprise a wide range of other optional components. These additional components should be pharmaceutically acceptable. Non-limiting examples of functional classes of ingredients suitable for

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use in the compositions of the present invention include: abrasives, absorbents, anti-acne actives, anticaking agents, anti-dandruff agents, anti-perspirant agents, antioxidants, anti-viral actives, artificial tanning actives and accelerators, biological additives, bleach, bleach activators, brighteners, builders, buffering agents, chelating agents, chemical additives, colorants, cosmetics, cleansers, cosmetic astringents, cosmetic biocides, denaturants, deodorants, desquamation actives, depilatories, drug astringents, dyes, dye transfer agents, enzymes, external analgesics, foam generators, flavours, film formers, fragrance components, insect repellents, mildewcides, non-steroidal anti-inflammatory active, opacifying agents, oxidative dyes, oxidising agents, pest control ingredients, pH adjusters such as citric acid, pH buffers, pharmaceutical actives, plasticizers, preservatives, radical scavengers, skin, hair or nail bleaching agents, skin, hair or nail conditioners, skin, hair or nail penetration enhancers, stabilisers, surfactants, surface conditioners, reducing agents, temperature depressors, viscosity modifiers, and warmth generators such as exothermic zeolites. Also useful herein are aesthetic components such as colourings, essential oils, and skin healing agents. Other optional materials herein include pigments. Pigments suitable for use in the compositions of the present invention can be organic and/or inorganic. Also included within the term pigment are materials having a low colour or lustre such as matte finishing agents, and also light scattering agents. Examples of suitable pigments are iron oxides, acyglutamate iron oxides, titanium dioxide, ultramarine blue, D&C dyes, carmine, and mixtures thereof.

### **Formulation Process**

Preferably the compositions of the present invention are prepared in such a way that the quaternary ammonium compound forms vesicles. It is preferred that said vesicles also comprise humectant. Preferably said vesicles also comprise emollient. Even more preferably said vesicles comprise pantothenic acid or pantothenic acid derivatives. In order to ensure optimal performance characteristics it is preferred that the compositions of the present invention are prepared as follows:

- (i) all or part of the quaternary ammonium agent is mixed with humectant, pantothenic acid or pantothenic acid derivatives, water soluble skin care actives (where included), and, preferably, polar solvent at a temperature which is higher than the melting point of the quaternary ammonium agent;

- (ii) optionally, the mixture is vigorously agitated;
- (iii) In a separate vessel the emulsion is prepared as follows;
- (iv) The oil phase containing the emollients, the relevant thickener in case the said thickener is oil soluble and any remaining quaternary ammonium agent are mixed together at a temperature which is higher than the melting point of the quaternary ammonium agent; The aqueous phase is prepared separately. The water, the relevant thickener in case the said thickener is water soluble, and any remaining water soluble ingredients are heated to the same temperature as the oil phase.
- (v) the temperature of the oil and aqueous phases of the emulsion are then approximately equalised and the aqueous phase is combined with the oil phase with agitation.
- (vi) On production of the emulsion the mixture formed in step (i) is added to the aforementioned emulsion with agitation.

#### **Method of Use**

The cosmetic compositions of the present invention may be used in a conventional manner for the treatment of skin. An effective amount of the composition, typically from about 0.1 grams to about 50 grams, preferably from about 1 gram to about 20 grams, is applied to wet or dry, preferably wet, skin. Application of the composition typically includes working the composition into the skin, generally with the hands and fingers. The composition is then left on the skin or, preferably, the skin is rinsed.

The preferred method of treating the skin, therefore, comprises the steps of:

- (a) applying an effective amount of the cosmetic composition to the skin,
- (b) rinsing the skin.

A preferred aspect of the present invention involves the above method with an application of the composition on dry skin before an application on wet skin. Therefore, a preferred method comprises:

- (i) applying to dry skin an effective amount of the cosmetic composition;
- (ii) rinsing the skin under a shower;
- (iii) further application of said composition; and
- (iv) further rinsing.

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|         |          |   |   |   |   |   |   |   |   |    |    |    |    |  |
|---------|----------|---|---|---|---|---|---|---|---|----|----|----|----|--|
| Example | 1        | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |  |
|         | Weight % |   |   |   |   |   |   |   |   |    |    |    |    |  |

|                                     |     |     |     |     |     |     |      |     |     |          |     |     |     |   |
|-------------------------------------|-----|-----|-----|-----|-----|-----|------|-----|-----|----------|-----|-----|-----|---|
|                                     |     |     |     |     |     |     |      |     |     |          |     |     |     |   |
| Quat. Amm, Agt<br>(see below)       | 3   | 3   | 3   | 3   | 3   | 3   | 3    | 3   | 3   | 3        | 3   | 3   | 3   | A |
| Glycerine                           | 32  | 32  | 32  | 32  | 32  | 32  | 32   | -   | -   | -        | -   | -   | -   | A |
| Urea                                | -   | -   | -   | -   | -   | -   | -    | 22  | 22  | 22       | 22  | 22  | 22  | A |
| Petrolatum                          | -   | -   | 10  | -   | 12  | 15  | -    | -   | -   | 10       | -   | 12  | 15  | B |
| Lanolin <sup>1</sup>                | -   | -   | -   | 7.5 | 5   | -   | 15   | -   | -   | -        | 10  | 10  | -   | B |
| Coronet Lanolin <sup>1</sup>        | -   | -   | -   | -   | -   | -   | 5    | -   | -   | -        | -   | -   | -   | B |
| Super Sterol<br>Esters <sup>1</sup> | -   | -   | -   | -   | -   | -   | 5    | -   | -   | -        | -   | -   | -   | B |
| Sefa Cottonate                      | 21  | 21  | 12  | 12  | -   | -   | -    | 21  | 21  | 12       | 12  | -   | -   | B |
| Dimethicone<br>10Cst                | -   | 0.5 | 0.5 | 0.5 | -   | 0.5 | 0.5  | 0.5 | -   | -        | -   | 0.5 | 0.5 | B |
| Dimethicone<br>1000Cst              | -   | 1.0 | 1.0 | 1.0 | -   | 1.0 | 1.0  | 1.0 | -   | -        | -   | 1.0 | 1.0 | B |
| Cyclomethicone                      | -   | 2.5 | 2.5 | 2.5 | -   | 2.5 | 2.5  | 2.5 | -   | -        | -   | 2.5 | 2.5 | B |
| Florasun PEG-10<br><sup>2</sup>     | -   | 2   | -   | 2   | -   | 3   | -    | 1   | -   | -        | 3   | -   | -   | B |
| Methyl Paraben                      | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5  | 0.5 | 0.5 | 0.5      | 0.5 | 0.5 | 0.5 | A |
| Propyl Paraben                      | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5  | 0.5 | 0.5 | 0.5      | 0.5 | 0.5 | 0.5 | B |
| Disodium EDTA                       | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1  | 0.1 | 0.1 | 0.1      | 0.1 | 0.1 | 0.1 | A |
| Sodium Benzoate                     | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3  | 0.3 | 0.3 | 0.3      | 0.3 | 0.3 | 0.3 | B |
| Niacinamide                         | 5   | 5   | 3   | 5   | 5   | 5   | 5    | 3   | 5   | 3        | 3   | 5   | 5   | A |
| Panthenol                           | 3   | 3   | 1   | 3   | 3   | 3   | 3    | 1   | 3   | 1        | 1   | 3   | 3   | A |
| Tocopherol<br>Acetate               | 2   | 2   | 0.5 | 2   | 2   | 2   | 2    | 0.5 | 2   | 0.5      | 0.5 | 2   | 2   | B |
| Retinol Palmitate                   | 0.1 | -   | -   | -   | -   | -   | 0.05 | -   | -   | 0.1      | -   | -   | -   | B |
| Parsol 1789 <sup>3</sup>            | -   | 1   | -   | 1   | 0.5 | -   | 0.1  | -   | 1   | -        | 1   | -   | 1   | B |
| Parsol MCX <sup>3</sup>             | -   | 5   | -   | 5   | 2.5 | -   | 0.5  | -   | 5   | -        | 5   | -   | 5   | B |
| Citric acid                         | 1   | 0.5 | 1   | 0.5 | 0.5 | 1   | 0.5  | 1   | 0.3 | 0.7<br>5 | 1   | 1   | 1   | A |
| Salicylic acid                      | -   | 0.5 | -   | 0.5 | 0.5 | -   | 0.5  | -   | 0.7 | -        | -   | -   | -   | A |
| Triethanolamine                     | 0.1 | -   | -   | 0.1 | 0.1 | -   | -    | -   | 0.1 | -        | -   | 0.9 | 0.5 | C |
| Sodium<br>Hydroxide                 | -   | -   | 0.1 | 0.1 | 0.1 | -   | -    | 0.1 | -   | 0.1      | -   | -   | -   | C |

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|                            |     |     |     |     |     |     |     |     |     |     |     |     |      |   |
|----------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|---|
| Polyquaternium 10          | -   |     | -   | 1.0 |     | -   | 0.5 | -   | 0.6 | -   | -   | -   | 0.5  | B |
| Polymer KG 30 <sup>4</sup> | -   | 0.7 | -   |     | 0.7 | -   |     | -   | -   | 0.8 | -   | -   | -    | B |
| Fragrance                  | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | -   | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5  | E |
| Cetyl Alcohol              | 3   | -   | -   | -   | 2.6 | -   | -   | 2.2 | -   | 2.2 | -   | 2.5 | -    | C |
| Stearyl Alcohol            | 2   | -   | -   | -   | 1.5 | -   | -   | 3.2 | -   | 1.1 | -   | 1.6 | -    | C |
| Cetearyl Alcohol           | -   | -   | 4   | -   | 0.4 | -   | -   | -   | 3.4 | -   | -   | -   | 3.4  | C |
| Behenyl Alcohol            | 2   | -   | 2   | -   | -   | -   | -   | 0.6 | -   | 0.7 | -   | -   | -    | C |
| Natrosol 330 Plus          | 1   | -   | -   | -   | 0.4 | -   | -   | 0.7 | 0.6 |     | -   | 0.5 | 0.25 | C |
| Natrosol 250 HHR           | -   | -   | 1   | -   | 0.3 | -   | -   | -   | -   | 1.2 | -   | -   | 0.3  | C |
| Jaguar HP 105 <sup>5</sup> | -   | 1.2 | -   | -   | -   | -   | -   | -   | -   | -   | 0.8 | -   | -    | D |
| Jaguar C14S <sup>5</sup>   | -   | -   | -   | 1   | -   | -   | -   | -   | -   | -   | -   | -   | -    | D |
| Jaguar C13S <sup>5</sup>   | -   | -   | -   | -   | -   | 1.2 | -   | -   | -   | -   | -   | -   | -    | D |
| Xanthan Gum                | -   | -   | -   | -   | -   | -   | 2.0 | -   | -   | -   | -   | -   | -    | D |
| Sodium Chloride            | -   | -   | 0.1 | -   | -   | -   | 0.5 | 0.2 | -   | 0.3 | -   | -   | -    | A |
| Water                      | qs  | qs  | qs  | qs  | qs  | qs  | qs  | qs  | qs  | qs  | qs  | qs  | qs   | A |

| Example                          | 14       | 15  | 16  | 17  | 18 | 19  | 20  | 21  | 22 | 23 | 24 | 25  | 26  |   |
|----------------------------------|----------|-----|-----|-----|----|-----|-----|-----|----|----|----|-----|-----|---|
|                                  | Weight % |     |     |     |    |     |     |     |    |    |    |     |     |   |
| Quat. Amm, Agt (see below)       | 8        | 8   | 8   | 8   | 8  | 8   | 8   | 8   | 8  | 8  | 8  | 8   | 8   | A |
| Glycerine                        | 32       | 32  | 32  | 32  | 32 | 32  | 32  | -   | -  | -  | -  | -   | -   | A |
| Urea                             | -        | -   | -   | -   | -  | -   | -   | 22  | 22 | 22 | 22 | 22  | 22  | A |
| Petrolatum                       | -        | -   | 10  | -   | 12 | 15  | -   | -   | -  | 10 | -  | 12  | 15  | B |
| Lanolin <sup>1</sup>             | -        | -   | -   | 7.5 | 5  | -   | 15  | -   | -  | -  | 10 | 10  | -   | B |
| Coronet Lanolin <sup>1</sup>     | -        | -   | -   | -   | -  | -   | 5   | -   | -  | -  | -  | -   | -   | B |
| Super Sterol Esters <sup>1</sup> | -        | -   | -   | -   | -  | -   | 5   | -   | -  | -  | -  | -   | -   | B |
| Sefa Cottonate                   | 21       | 21  | 12  | 12  | -  | -   | -   | 21  | 21 | 12 | 12 | -   | -   | B |
| Dimethicone 10Cst                | -        | 0.5 | 0.5 | 0.5 | -  | 0.5 | 0.5 | 0.5 | -  | -  | -  | 0.5 | 0.5 | B |
| Dimethicon                       | -        | 1.0 | 1.0 | 1.0 | -  | 1.0 | 1.0 | 1.0 | -  | -  | -  | 1.0 | 1.0 | B |

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|                             |     |     |     |     |     |     |     |     |     |     |     |     |     |   |
|-----------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| 1000Cst                     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |
| Cyclomethicone              | -   | 2.5 | 2.5 | 2.5 | -   | 2.5 | 2.5 | 2.5 | -   | -   | -   | 2.5 | 2.5 | B |
| FlorasunPEG-10 <sup>2</sup> | -   | 2   | -   | 2   | -   | 3   | -   | 1   | -   | -   | 3   | -   | -   | B |
| Methyl Paraben              | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | A |
| Propyl Paraben              | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | B |
| Disodium EDTA               | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | A |
| Sodium Benzoate             | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | B |
| Niacinamide                 | 5   | 5   | 3   | 5   | 5   | 5   | 5   | 3   | 5   | 3   | 3   | 5   | 5   | A |
| Panthenol                   | 3   | 3   | 1   | 3   | 3   | 3   | 3   | 1   | 3   | 1   | 1   | 3   | 3   | A |
| Tocopherol                  | 2   | 2   | 0.5 | 2   | 2   | 2   | 2   | 0.5 | 2   | 0.5 | 0.5 | 2   | 2   | B |
| Acetate                     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |
| Retinol Palmitate           | 0.1 | -   | -   | -   | -   | .05 | -   | -   | -   | -   | -   | -   | 0.1 | B |
| Parsol 1789 <sup>3</sup>    | -   | 1   | -   | 1   | 0.5 | -   | 0.1 | -   | 1   | -   | 1   | -   | 1   | B |
| Parsol MCX <sup>3</sup>     | -   | 5   | -   | 5   | 2.5 | -   | 0.5 | -   | 5   | -   | 5   | -   | 5   | B |
| Citric acid                 | 1   | 0.5 | 1   | 0.5 | 0.5 | 1   | 0.5 | 1   | 0.3 | 0.7 | 1   | 1   | 1   | A |
| Salicylic acid              | -   | 0.5 | -   | 0.5 | 0.5 | -   | 0.5 | -   | 0.7 | -   | -   | -   | -   | A |
| Triethanolamine             | 0.1 | -   | -   | 0.1 | 0.1 | -   | -   | -   | 0.1 | -   | -   | 0.9 | 0.5 | C |
| Sodium Hydroxide            | -   | -   | 0.1 | 0.1 | 0.1 | -   | -   | 0.1 | -   | 0.1 | -   | -   | -   | C |
| Polyquaternium 10           | -   |     | -   | 1.0 |     | -   | 0.5 | -   | 0.6 | -   | -   | -   | 0.5 | B |
| Polymer KG 30 <sup>4</sup>  | -   | 0.7 | -   |     | 0.7 | -   |     | -   | -   | 0.8 | -   | -   | -   | B |
| Fragrance                   | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | -   | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | E |
| Cetyl Alcohol               | 3   | -   | -   | -   | 2.6 | -   | -   | 2.2 | -   | 2.2 | -   | 2.5 | -   | C |
| Stearyl Alcohol             | 2   | -   | -   | -   | 1.5 | -   | -   | 3.2 | -   | 1.1 | -   | 1.6 | -   | C |
| Cetearyl Alcohol            | -   | -   | 4   | -   | 0.4 | -   | -   | -   | 3.4 | -   | -   | -   | 3.4 | C |
| Behenyl Alcohol             | 2   | -   | 2   | -   | -   | -   | -   | 0.6 | -   | 0.7 | -   | -   | -   | C |
| Natrosol 330 Plus           | 1   | -   | -   | -   | 0.4 | -   | -   | 0.7 | 0.6 |     | -   | 0.5 | 0.2 | C |
|                             |     |     |     |     |     |     |     |     |     |     |     |     | 5   |   |
| Natrosol 250 HHR            | -   | -   | 1   | -   | 0.3 | -   | -   | -   | -   | 1.2 | -   | -   | 0.3 | C |
| Jaguar HP 105 <sup>5</sup>  | -   | 1.2 | -   | -   | -   | -   | -   | -   | -   | -   | 0.8 | -   | -   | D |
| Jaguar C14S <sup>5</sup>    | -   | -   | -   | 1   | -   | -   | -   | -   | -   | -   | -   | -   | -   | D |
| Jaguar C13S <sup>5</sup>    | -   | -   | -   | -   | -   | 1.2 | -   | -   | -   | -   | -   | -   | -   | D |
| Xanthan Gum                 | -   | -   | -   | -   | -   | -   | 2.0 | -   | -   | -   | -   | -   | -   | D |

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|                |    |    |     |    |    |    |     |     |    |     |    |    |    |   |
|----------------|----|----|-----|----|----|----|-----|-----|----|-----|----|----|----|---|
| Sodium Chlorid | -  | -  | 0.1 | -  | -  | -  | 0.5 | 0.2 | -  | 0.3 | -  | -  | -  | A |
| Water          | qs | qs | qs  | qs | qs | qs | qs  | qs  | qs | qs  | qs | qs | qs | A |

| Example                             | 27       | 28  | 29  | 30  | 31  | 32  | 33  | 34  | 35  | 36  | 37  | 38  | 39  | 40  | 41  | 42  |   |
|-------------------------------------|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
|                                     | Weight % |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |
| Quat Amm, Agt<br>(see below)        | 3        | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 3   | 8   | A |
| Glycerine                           | 15       | 16  | 22  | 9   | 8   | 9   | -   | 32  | 32  | 32  | 32  | 32  | 32  | 32  | 32  | 15  | A |
| Propylene Glycol                    | -        | 16  | -   | -   | -   | 5   | 12  | -   | -   | -   | -   | -   | -   | -   | -   | -   | A |
| Butylene Glycol                     | -        | -   | 8   | 8   | -   | 8   | 12  | -   | -   | -   | -   | -   | -   | -   | -   | -   | A |
| Urea                                | -        | -   | -   | 12  | -   | 2   | 9   | -   | -   | -   | -   | -   | -   | -   | -   | -   | A |
| Petrolatum                          | -        | -   | 10  | -   | 12  | 15  | -   | -   | 4   | 7.5 | -   | 12  | 5   | -   | 6   | -   | B |
| Lanolin <sup>1</sup>                | -        | -   | -   | 7.5 | 7.5 | -   | 15  | -   | 3.5 | -   | 3   | -   | -   | -   | -   | -   | B |
| Coronet<br>Lanolin <sup>1</sup>     | -        | -   | -   | -   | -   | -   | -   | -   | 7   | -   | 6.7 | -   | -   | 6   | -   | -   | B |
| Super Sterol<br>Esters <sup>1</sup> | -        | -   | -   | -   | -   | -   | -   | -   | 3.5 | -   | 6.5 | -   | 3   | 6   | 3   | -   | B |
| Isohexadecane                       | -        | -   | -   | -   | -   | -   | -   | -   | -   | 5   | -   | 3   | -   | -   | 3   | -   | B |
| Isononyl<br>Isononanoate            | -        | -   | -   | -   | -   | -   | -   | -   | -   | 3   | -   | 5   | -   | -   | -   | -   | B |
| Sefa Cottonate                      | 21       | 21  | 12  | 12  | -   | -   | -   | 13  | -   | 8   | -   | -   | 8   | 12  | 10  | 21  | B |
| Sefa Behenate                       | -        | -   | -   | -   | -   | -   | -   | 9   | -   | -   | 3   | -   | 5   | -   | -   | -   | B |
| Dimethicone<br>10Cst                | -        | 0.5 | 0.5 | 0.5 | -   | 0.5 | 0.5 | 0.5 | -   | -   | -   | 0.5 | 0.5 | -   | -   | -   | B |
| Dimethicone<br>1000Cst              | -        | 1.0 | 1.0 | 1.0 | -   | 1.0 | 1.0 | 1.0 | -   | -   | -   | 1.0 | 1.0 | -   | -   | -   | B |
| Cyclomethicone                      | -        | 2.5 | 2.5 | 2.5 | -   | 2.5 | 2.5 | 2.5 | -   | -   | -   | 2.5 | 2.5 | -   | -   | -   | B |
| Florasun PEG-<br>10 <sup>2</sup>    | -        | 2   | -   | 2   | -   | 3   | -   | 1   | -   | -   | 3   | -   | -   | 2.5 | -   | -   | B |
| Methyl Paraben                      | 0.5      | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | A |
| Propyl Paraben                      | 0.5      | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | B |
| Disodium EDTA                       | 0.1      | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | A |
| Sodium                              | 0.3      | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | B |

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|                            |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |   |
|----------------------------|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| Benzoate                   |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |   |
| Niacinamide                | 3   | 5   | 5   | 3   | 3   | 5    | 5   | 5   | 3   | 3   | 5   | 5   | 5   | 5   | 3   | 3   | A |
| Panthenol                  | 1   | 3   | 3   | 1   | 1   | 3    | 3   | 3   | 1   | 1   | 3   | 3   | 3   | 3   | 1   | 1   | A |
| Tocopherol                 | 0.5 | 2   | 2   | 0.5 | 0.5 | 2    | 2   | 2   | 0.5 | 0.5 | 2   | 2   | 2   | 2   | 0.5 | 0.5 | B |
| Acetate                    |     |     |     |     |     |      |     |     |     |     |     |     |     |     |     |     |   |
| Retinol Palmitate          | -   | -   | -   | 0.1 | -   | 0.05 | -   | -   | 0.1 | -   | -   | -   | -   | -   | -   | -   | B |
| Parsol 1789 <sup>3</sup>   | -   | 1   | -   | 1   | 0.5 | -    | 1   | -   | 1   | -   | 1   | -   | 0.1 | 1   | -   | -   | B |
| Parsol MCX <sup>3</sup>    | -   | 5   | -   | 5   | 2.5 | -    | 5   | -   | 5   | -   | 5   | -   | 0.5 | 5   | -   | -   | B |
| Citric acid                | 1   | 0.5 | 1   | 0.5 | 0.5 | 1    | 0.5 | 1   | 0.3 | 0.7 | 1   | 1   | 1   | 1   | -   | 1   | A |
|                            |     |     |     |     |     |      |     |     |     | 5   |     |     |     |     |     |     |   |
| Salicylic acid             | -   | 0.5 | -   | 0.5 | 0.5 | -    | 0.5 | -   | 0.7 | -   | -   | -   | -   | -   | 0.5 | -   | A |
| Triethanolamine            | 0.1 | -   | -   | 0.1 | 0.1 | -    | -   | -   | 0.1 | -   | -   | 0.9 | 0.5 | -   | -   | 0.1 | C |
| Sodium Hydroxide           | -   | -   | 0.1 | 0.1 | 0.1 | -    | -   | 0.1 | -   | 0.1 | -   | -   | -   | -   | 0.6 | -   | C |
| Polyquaternium 10          | -   | -   | -   | 1.0 | -   | -    | 0.5 | -   | 0.6 | -   | -   | -   | 0.5 | 1.0 | -   | -   | B |
| Polymer KG 30 <sup>4</sup> | -   | 0.7 | -   | -   | 0.7 | -    | -   | -   | -   | 0.8 | -   | -   | -   | -   | 0.8 | -   | B |
| Fragrance                  | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | -    | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | E |
| Cetyl Alcohol              | 3   | -   | -   | -   | 2.6 | -    | -   | 2.2 | -   | 2.2 | -   | 2.5 | -   | -   | 3.2 | 3   | C |
| Stearyl Alcohol            | 2   | -   | -   | -   | 1.5 | -    | -   | 3.2 | -   | 1.1 | -   | 1.6 | -   | -   | 2.6 | 2   | C |
| Cetearyl Alcohol           | -   | -   | 4   | -   | 0.4 | -    | -   | -   | 3.4 | -   | -   | -   | 3.4 | -   | -   | -   | C |
| Behenyl Alcohol            | 2   | -   | 2   | -   | -   | -    | -   | 0.6 | -   | 0.7 | -   | -   | -   | -   | 0.2 | 2   | C |
| Natrosol 330 Plus          | 1   | -   | -   | -   | 0.4 | -    | -   | 0.7 | 0.6 | -   | -   | 0.5 | 0.2 | -   | 0.6 | 1   | C |
|                            |     |     |     |     |     |      |     |     |     |     |     |     | 5   |     |     |     |   |
| Natrosol 250 HHR           | -   | -   | 1   | -   | 0.3 | -    | -   | -   | -   | 1.2 | -   | -   | 0.3 | -   | -   | -   | C |
| Jaguar HP 105 <sup>5</sup> | -   | 1.2 | -   | -   | -   | -    | -   | -   | -   | -   | 0.8 | -   | -   | -   | -   | -   | D |
| Jaguar C14S <sup>5</sup>   | -   | -   | -   | 1   | -   | -    | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | D |
| Jaguar C13S <sup>5</sup>   | -   | -   | -   | -   | -   | -    | 1.2 | -   | -   | -   | -   | -   | -   | -   | 0.6 | -   | D |
| Xanthan Gum                | -   | -   | -   | -   | -   | -    | 3.0 | -   | -   | -   | -   | -   | -   | -   | -   | -   | D |
| Sodium Chloride            | -   | -   | 0.1 | -   | -   | -    | 0.5 | 0.2 | -   | 0.3 | -   | -   | -   | 0.2 | 0.1 | -   | A |
| Water                      | qs  | qs  | qs  | qs  | qs  | qs   | qs  | qs  | qs  | qs  | qs  | qs  | qs  | qs  | qs  | qs  | A |

|         |    |    |    |    |    |    |    |    |    |    |    |    |    |    |  |
|---------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|
| Example | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 |  |
|---------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|

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|                                  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |
|----------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
|                                  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |
| Quat                             | 8   | 8   | 8   | 8   | 8   | 8   | 8   | 8   | 8   | 8   | 8   | 8   | 8   | 8   | A |
| Glycerine                        | 16  | 22  | 9   | 8   | 9   | -   | 32  | 32  | 32  | 32  | 32  | 32  | 32  | 32  | A |
| Propylene Glycol                 | 16  | -   | -   | -   | 5   | 12  | -   | -   | -   | -   | -   | -   | -   | -   | A |
| Butylene Glycol                  | -   | 8   | 8   | -   | 8   | 12  | -   | -   | -   | -   | -   | -   | -   | -   | A |
| Urea                             | -   | -   | 12  | -   | 2   | 9   | -   | -   | -   | -   | -   | -   | -   | -   | A |
| Petrolatum                       | -   | 10  | -   | 12  | 15  | -   | -   | 4   | 7.5 | -   | 12  | 5   | -   | 6   | B |
| Lanolin <sup>1</sup>             | -   | -   | 7.5 | 7.5 | -   | 15  | -   | 3.5 | -   | 3   | -   | -   | -   | -   | B |
| Coronet Lanolin <sup>1</sup>     | -   | -   | -   | -   | -   | -   | -   | 7   | -   | 6.7 | -   | -   | 6   | -   | B |
| Super Sterol Esters <sup>1</sup> | -   | -   | -   | -   | -   | -   | -   | 3.5 | -   | 6.5 | -   | 3   | 6   | 3   | B |
| Isohexadecane                    | -   | -   | -   | -   | -   | -   | -   | -   | 5   | -   | 3   | -   | -   | 3   | B |
| Isononyl Isononanoate            | -   | -   | -   | -   | -   | -   | -   | -   | 3   | -   | 5   | -   | -   | -   | B |
| Sefa Cottonate                   | 21  | 12  | 12  | -   | -   | -   | 13  | -   | 8   | -   | -   | 8   | 12  | 10  | B |
| Sefa Behenate                    | -   | -   | -   | -   | -   | -   | 9   | -   | -   | 3   | -   | 5   | -   | -   | B |
| Dimethicone 10Cst                | 0.5 | 0.5 | 0.5 | -   | 0.5 | 0.5 | 0.5 | -   | -   | -   | 0.5 | 0.5 | -   | -   | B |
| Dimethicone 1000Cst              | 1.0 | 1.0 | 1.0 | -   | 1.0 | 1.0 | 1.0 | -   | -   | -   | 1.0 | 1.0 | -   | -   | B |
| Cyclomethicone                   | 2.5 | 2.5 | 2.5 | -   | 2.5 | 2.5 | 2.5 | -   | -   | -   | 2.5 | 2.5 | -   | -   | B |
| Florasun PEG-10 <sup>2</sup>     | 2   | -   | 2   | -   | 3   | -   | 1   | -   | -   | 3   | -   | -   | 2.5 | -   | B |
| Methyl Paraben                   | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | A |
| Propyl Paraben                   | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | B |
| Disodium EDTA                    | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | A |
| Sodium Benzoate                  | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | B |
| Niacnamide                       | 5   | 5   | 3   | 5   | 5   | 5   | 5   | 3   | 3   | 5   | 5   | 5   | 5   | 3   | A |
| Panthenol                        | 3   | 3   | 1   | 3   | 3   | 3   | 3   | 1   | 1   | 3   | 3   | 3   | 3   | 1   | A |
| Tocopherol                       | 2   | 2   | 0.5 | 2   | 2   | 2   | 2   | 0.5 | 0.5 | 2   | 2   | 2   | 2   | 0.5 | B |

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|                            |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |
|----------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| Acetate                    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |
| Retinol                    | -   | -   | -   | -   | -   | -   | -   | 0.0 | -   | -   | 0.1 | -   | -   | -   | B |
| Palmitate                  |     |     |     |     |     |     |     | 5   |     |     |     |     |     |     |   |
| Parsol 1789 <sup>3</sup>   | 1   | -   | 1   | 0.5 | -   | 1   | -   | 1   | -   | 1   | -   | 0.1 | 1   | -   | B |
| Parsol MCX <sup>3</sup>    | 5   | -   | 5   | 2.5 | -   | 5   | -   | 5   | -   | 5   | -   | 0.5 | 5   | -   | B |
| Citric acid                | 0.5 | 1   | 0.5 | 0.5 | 1   | 0.5 | 1   | 0.3 | 0.7 | 1   | 1   | 1   | 1   | -   | A |
|                            |     |     |     |     |     |     |     | 5   |     |     |     |     |     |     |   |
| Salicylic acid             | 0.5 | -   | 0.5 | 0.5 | -   | 0.5 | -   | 0.7 | -   | -   | -   | -   | -   | 0.5 | A |
| Triethanolamin             | -   | -   | 0.1 | 0.1 | -   | -   | -   | 0.1 | -   | -   | 0.9 | 0.5 | -   | -   | C |
| e                          |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |
| Sodium Hydroxide           | -   | 0.1 | 0.1 | 0.1 | -   | -   | 0.1 | -   | 0.1 | -   | -   | -   | -   | 0.6 | C |
| Polyquaternium 10          | -   | -   | 1.0 | -   | -   | 0.5 | -   | 0.6 | -   | -   | -   | 0.5 | 1.0 | -   | B |
| Polymer KG 30 <sup>4</sup> | 0.7 | -   | -   | 0.7 | -   |     | -   | -   | 0.8 | -   | -   | -   | -   | 0.8 | B |
| Fragrance                  | 0.5 | 0.5 | 0.5 | 0.5 | -   | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | E |
| Cetyl Alcohol              | -   | -   | -   | 2.6 | -   | -   | 2.2 | -   | 2.2 | -   | 2.5 | -   | -   | 3.2 | C |
| Stearyl Alcohol            | -   | -   | -   | 1.5 | -   | -   | 3.2 | -   | 1.1 | -   | 1.6 | -   | -   | 2.6 | C |
| Cetearyl Alcohol           | -   | 4   | -   | 0.4 | -   | -   | -   | 3.4 | -   | -   | -   | 3.4 | -   | -   | C |
| Behenyl Alcohol            | -   | 2   | -   | -   | -   | -   | 0.6 | -   | 0.7 | -   | -   | -   | -   | 0.2 | C |
| Natrosol 330 Plus          | -   |     | -   | 0.4 | -   | -   | 0.7 | 0.6 |     | -   | 0.5 | 0.2 | -   | 0.6 | C |
|                            |     |     |     |     |     |     |     |     |     |     | 5   |     |     |     |   |
| Natrosol 250 HHR           | -   | 1   | -   | 0.3 | -   | -   | -   | -   | 1.2 | -   | -   | 0.3 | -   | -   | C |
| Jaguar HP 105 <sup>5</sup> | 1.2 | -   | -   | -   | -   | -   | -   | -   | -   | 0.8 | -   | -   | -   | -   | D |
| Jaguar C14S <sup>5</sup>   | -   | -   | 1   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | D |
| Jaguar C13S <sup>5</sup>   | -   | -   | -   | -   | 1.2 | -   | -   | -   | -   | -   | -   | -   | 0.8 | -   | D |
| Xanthan Gum                | -   | -   | -   | -   | -   | 3.0 | -   | -   | -   | -   | -   | -   | -   | -   | D |
| Sodium Chloride            | -   | 0.1 | -   | -   | -   | 0.5 | 0.2 | -   | 0.3 | -   | -   | -   | 0.2 | 0.1 | A |
| Water                      | qs  | qs  | qs  | qs  | qs  | qs  | qs  | qs  | qs  | qs  | qs  | qs  | qs  | qs  | A |

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- 1; Available from Croda  
 2; Available from Floratech, AZ, USA  
 3; Available from Hoffman La Roche, NJ, USA  
 5 4; Available from Amerchol, NJ, USA  
 5; Available from Rhodia, NJ, USA

- 10 • In examples 1, 4, 7, 9, 17, 20, 22, 24, 28, 36, 38, 47, 49, 53, 56 the quaternary ammonium compound used is Distearyl Dimethyl Ammonium Chloride supplied by Goldschmidt, trade name Varisoft TA100.
- In examples 2, 3, 5, 6, 8, 10, 15, 16, 18, 19, 21, 23, 26, 27, 31, 33, 34, 35, 37, 41, 45, 46, 48, 50, 51, 52, 54, 55, the quaternary ammonium compounds used is N,N-di(canolyl-oxy-ethyl)-N methyl,N-(2-hydroxyethyl)Ammonium Methyl Sulfate supplied by Goldschmidt, trade name Rewoquat V3620.
- 15 • In Example 11 the quaternary ammonium compound used is N,N-di(canolyl-oxy-ethyl)-N methyl,N-(2-hydroxyethyl)Ammonium Methyl Sulfate supplied by Goldschmidt, trade name Rewoquat WE18
- In Example 12 the quaternary ammonium compound used is N,N-di(canolyl-oxy-ethyl)-N methyl,N-(2-hydroxyethyl)Ammonium Chloride supplied by Goldschmidt, developmental material (WE25)
- 20 • In Example 13 the quaternary ammonium compound used is Methylbis(hydrogenated tallowamidoethyl)(2-hydroxyethyl)ammonium methyl sulfate supplied by Goldschmidt, trade name Varisoft 110.
- In Example 14 the quaternary ammonium compound used is Methylbis(tallowamidoethyl)(2-hydroxyethyl)ammonium methyl sulfate supplied by Goldschmidt, trade name Varisoft 222.
- 25 • In Example 25 the quaternary ammonium compound used is Methyl-1-tallowoylethyl-2-tallowimidazoline supplied by Goldschmidt, developmental material
- 
- 30 • In Example 29 the quaternary ammonium compound used is Methyl-1-tallowamidoethyl-2-tallowimidazoline supplied by Goldschmidt, developmental material
- In Example 30 the quaternary ammonium compound used is Methyl-1-tallowoylethyl-2-tallowimidazolinium methyl sulfate supplied by Goldschmidt,

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- In Example 32 the quaternary ammonium compound used is Methyl-1-tallowamidoethyl-2-tallowimidazolinium methyl sulfate supplied by Goldschmidt, trade name Varisoft 475, Varisoft 445
- In Example 39 the quaternary ammonium compound used is N,N-Dimethyl-N-(canolyl-oxy-ethyl)-N-(canolamidoethyl) amine, supplied by Kao.
- In Example 40 the quaternary ammonium compound used is N,N-Dimethyl-N-(canolyl-oxy-ethyl)-N-(canolamidoethyl) Ammonium Methyl Sulfate, supplied by Kao
- In Example 42 the quaternary ammonium compound used is N,N'-Bis(2-talloyloxyethyl)-N,N,N',N'-Tetramethylene Diammonium Dichloride, as disclosed in patents US 4728337, US 4721512, US 4906413 from Ciba-Geigy Corporation
- In Example 43 the quaternary ammonium compound used is N,N'-Bis(2-canolyloxyethyl)-N,N'-Dimethyl-N,N'-(2-Hydroxyethyl)-1,6-Hexane Diammonium Methyl Sulfate, as disclosed in patents EP 0503155A1 & EP 0803498 from Goldschmidt-Witco.
- In Example 44 the quaternary ammonium compound used is the di and oligo ester quats made by the reaction of fatty acid, di functional (or multi functional) acid and triethanolamine followed by quaternisation as disclosed in WO98/49132 by Kao and US 5880289 by Henkel.

#### Process

##### For those examples including component C:

1. **Premix 1:** Combine components of group A together at a temperature greater than the transition temperature of the chosen quaternary ammonium compound, keeping back a predetermined part of the quaternary ammonium compound and water. Vigorously agitate this premix.
2. **Premix 2:** Combine components of groups B and C with the remaining parts of the quaternary ammonium compounds and water not previously used in premix 1. Heat above the melting point of the quat and the oils.
3. Combine Premix 1 & 2 and allow to cool until 40°C, stir in the perfume.

##### For those examples including component D:

1. **Premix 1:** Combine components of group A together at a temperature greater than the transition temperature of the chosen quaternary ammonium

compound, keeping back a predetermined part of the water. Vigorously agitate this premix.

**2. Premix 2:** Combine with agitation the components of group D with the water not previously used in premix 1.

5 **3.** Combine Premix 1 & 2 and components of groups B & E. Vigorously agitate.

The compositions of the above examples provide good skin care benefits, such as good moisturisation, good hydration, good skin feel, good skin softness and/or good skin smoothness, with low levels of negatives such as greasiness, stickiness or tack.

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Claims

1. A cosmetic composition comprising:

- 5 (a) at least one quaternary ammonium agent; and  
 (b) greater than 0.5% of pantothenic acid or pantothenic acid derivative and mixtures thereof.

2. A composition according to Claim 1 wherein the pantothenic acid or pantothenic acid derivative is selected from panthenols and mixtures thereof.

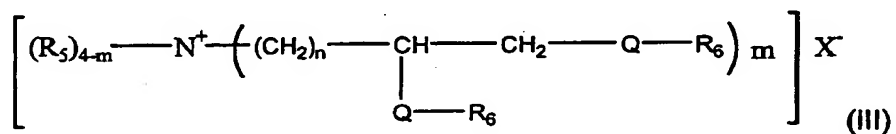
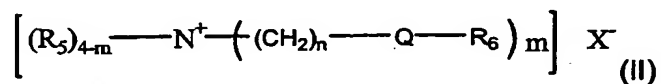
3. A composition according to Claim 1 or 2 wherein the composition further comprises a tocopherol-based anti-oxidant/radical scavenger.

4. A composition according to any of the preceding claims wherein the composition further comprises a vitamin B<sub>3</sub> compound.

5. A composition according to any of the preceding claims wherein the composition additionally comprises a skin benefit agent.

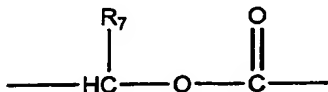
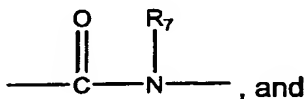
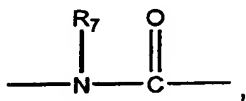
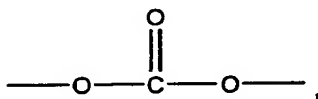
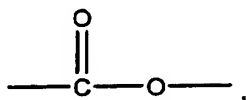
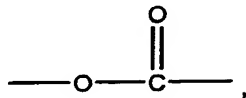
6. A composition according to any of the preceding claims wherein composition additionally comprises a skin benefit agent selected from humectant, emollient and mixtures thereof.

7. A composition according to any of the preceding claims wherein the quaternary ammonium agent is selected from those according to general formula (II) or (III):



wherein, each R<sub>5</sub> unit is independently selected from hydrogen, branched or straight chain C<sub>1</sub>-C<sub>8</sub> alkyl, branched or straight chain C<sub>1</sub>-C<sub>8</sub> hydroxyalkyl and

mixtures thereof, preferably methyl and hydroxyethyl; each  $R_6$  unit is independently linear or branched  $C_{11}$ - $C_{22}$  alkyl, linear or branched  $C_{11}$ - $C_{22}$  alkenyl, and mixtures thereof;  $X^-$  is an anion which is compatible with skin care actives and adjunct ingredients;  $m$  is from 1 to 4, preferably 2;  $n$  is from 1 to 4, preferably 2 and  $Q$  is a carbonyl unit selected from:



wherein  $R_7$  is hydrogen,  $C_1$ - $C_4$  alkyl,  $C_1$ - $C_4$  hydroxyalkyl, and mixtures thereof.

8. A composition according to any of the preceding claims wherein the composition comprises vesicles, said vesicles comprising quaternary ammonium agent and pantothenic acid or pantothenic acid derivative.

9. A composition according to any of the preceding claims wherein said composition comprises less than 5%, preferably less than 3%, preferably 0%, by weight, of anionic surfactant.



10. Use of a composition according to any of the preceding claims for the treatment of skin.

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**Abstract**

According to the present invention there is provided a cosmetic composition comprising:

- 5           (a) at least one quaternary ammonium agent; and  
          (b) greater than 0.5% of pantothenic acid or pantothenic acid derivative  
          and mixtures thereof.

- 10       The compositions of the present invention give the benefits associated with  
pantothenic acid or pantothenic acid derivatives such as wound healing and and  
skin-protection while reducing the associated negatives such as irritation,  
tackiness and/or stickiness.

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